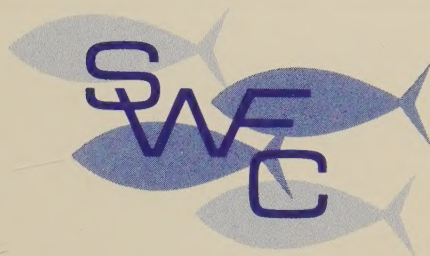




HONOLULU
LA JOLLA
MONTEREY
TIBURON



SOUTHWEST FISHERIES CENTER

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Pacific Environmental Group, Chief	<i>Andrew Bakun</i>
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SOUTHWEST FISHERIES CENTER
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HONOLULU LABORATORY
LA JOLLA LABORATORY
PACIFIC ENVIRONMENTAL GROUP
TIBURON LABORATORY

MONTHLY REPORT - MARCH 1984

STATUS OF PUBLICATIONS

Published

Alvariño, Angeles. 1983. 27. Chaetognatha, pp. 531-544. In: K.G. and R.G. Adiyodi (eds.), Reproductive Biology of Invertebrates, Vol. II: Spermatogenesis and Sperm Function. John Wiley & Sons Ltd.

Alvariño, Angeles. 1983. Nectocarmen antonioi, a new prayinae, Calycothorae, Siphonophora from California. Proc. Biol. Soc. Wash. 96(3):339-348.

Nectocarmen antonioi n. gen., n. sp. was found 13 April 1981 at 33°36.7'N, 118°18.4'W, off California, at a depth of less than 70 m. The siphonophore was complete, with nectophores, gastrozooids, tentacles, palps, tentilla, bracts, and gonophores. It differs from other genera (Rosacea, Nectodroma or Praya, Prayoides, Lilyopsis, Desmophyes, Stephanophyes) in the subfamily Prayinae, in the characteristics of its nectophores, bracts, and gonophores, and constitutes a morphological link among them.

Alvariño, Angeles and Kenneth R. Frankwick. 1983. Heteropyramis alcala and Thalassophyes ferrarii, new species of Clausophyidae (Calycothorae: Siphonophorae) from the South Pacific. Proc. Biol. Soc. Wash. 96(4): 1983; 686-692.

Two new species, Heteropyramis alcala, and Thalassophyes ferrarii are described and compared with the other species of their genera, Heteropyramis maculata Moser, 1925, and Thalassophyes crystallina Moser, 1925. The material was obtained in the plankton collections made in the South Pacific during the U.S. Antarctic Research Program.

- Alvariño, Angeles, Deborah F. Verfaillie, and Richard F. Ford.
1983. Antarctic Chaetognatha: United States Antarctic Research Program Eltanin cruises 10-23, 25, and 27, Part 2, pp.69-204. In: Louis S. Kornicker (ed.), Biology of the Antarctic Seas XIV Antarctic Research Series, Vol. 39, Paper 2.
- Brown, Martha. 1984. Counting dolphins: New answers to an important question. Sea Frontiers 30(2):68-75.
- MacCall, Alec D., Keith R. Parker, Ronald Leithiser, and Bill Jessee.
1984. Power plant impact assessment: a simple fishery production model approach. Fish. Bull., U.S. 81(3):613-619.
- Matsumoto, Walter M., Robert A. Skillman, and Andrew E. Dizon. 1984. Synopsis of biological data on skipjack tuna, Katsuwonus pelamis. U.S. Dep. Commer., NOAA Tech. Rep., NMFS CIRC-451, 92p. (FAO Fisheries Synopsis No. 136).

This synopsis of biological data on skipjack tuna, Katsuwonus pelamis, includes information on nomenclature, taxonomy, morphology, distribution, reproduction, nutrition, growth, behavior, physiology, population structure, exploitation, and management of the species. Over 600 of the more important published and unpublished reports up to 1980, including some published in 1981, were consulted.

- Ralston, Stephen, and Garret T. Miyamoto. 1983. Analyzing the width of daily otolith increments to age the Hawaiian snapper, Pristipomoides filamentosus, Fish. Bull., U.S. 81:523-535.

Studies of otolith microstructure in Hawaiian snapper, Pristipomoides filamentosus, indicate that growth increments are deposited daily in immature fish (<40 cm FL and <3 yr of age). Laboratory experiments with tetracycline-injected fish and analysis of modal progression in size-frequency distributions of field-sampled fish validate this conclusion. Given a 1:1 correspondence between increments and days, one can determine otolith growth rate by measuring increment width. Based on the relationship between otolith growth rate and otolith length, we conclude that increment deposition in mature P. filamentosus is episodic, i.e., interrupted.

Using regression analysis, a model is developed relating otolith growth rate to otolith length. It is shown that integration of the regression equation provides estimates of the age of individual fish. Assumptions involved in the model are discussed, and it is concluded that this method of ageing adequately represents the growth of P. filamentosus when time is measured on a scale of years. Age estimates derived here are entirely consistent with those of related forms (Lutjanidae) reported in the literature.

Yablokov, A.V., W.F. Perrin and M.V. Mina. 1983. Evaluation of phenetic relations among groups of dolphins using analysis of non-metric cranial variation. *Zoologicheskiy Zhurnal* 62:1887-1896.

Non-metric variation of 31 characters was studied in 5 samples (185 skulls) of Stenella attenuata and in 2 samples (34 skulls) of S. longirostris from off the Pacific coasts of southern Mexico and Central America. The samples were compared using 15 characters found to be independent of sex and age. An integrative "index of similarity" (Zhivotovskiy, 1982) was calculated. Offshore samples of S. attenuata showed a high degree of similarity and differed sharply from a coastal sample. The two samples of S. longirostris differed more from each other than did any two of the samples of S. attenuata. The discriminative power of the characters is discussed.

Approved by Center Director

Benville, Pete E., Jr., Jeannette A. Whipple, and Maxwell B. Eldridge. Acute toxicity of seven alicyclic hexanes to striped bass (Morone saxatilis) and bay shrimp (Crangon franciscorum) in seawater. Calif. Fish Game.

Eldridge, Maxwell B., Roger E. Green, and Paul G. Wares. Fish community study of Richardson Bay, California. Calif. Fish Game.

Moser, H.G. Scorpaenidae: Development. For publication in Ahlstrom Symposium Book.

Moser, H. Geoffrey and John Butler. Descriptions of reared larvae of six species of Sebastes (S. constellatus, S. entomelas, S. ovalis, S. rubrivinctus, S. rufus, S. serranoides). Workshop publication held at Tiburon.

Picquelle, Susan J. and Roger P. Hewitt. Estimates of the spawning biomass of the northern anchovy for the 1983-84 California fishing season. For consideration for publication in CalCOFI Reports.

Weber, Earl C. and Stephen R. Goldberg. The sex ratio and gonad indices of swordfish (Xiphias gladius) caught off the coast of southern California in 1978. For consideration for publication in California Fish and Game (Note).

Administrative Reports

Fairaizl, Gale W. 1984. Intra-atoll resightings of the Hawaiian monk seal, Monachus schauinslandi, at French Frigate Shoals, 1 January 1983-31 August 1983. Southwest Fish. Cent. Admin. Rep., H-84-5C.

Translations

- Honma, Yoshiharu, and Rokuro Mizusawa. 1969. A record of the young of boarfish, Pseudopentaceros richardsoni, from North Pacific. Jpn. J. Ichthyol. 15(3):134-136. (Translated from the Japanese by Tamio Otsu, Transl. No. 90, 5 p.).
- Watanabe, Yoh. 1983. The development of the southern water skip-jack tuna fishing grounds by the distant water purse seine fishery (Kaigai maki-ami ni yoru nanpo katsuo gyojo kaihatsu). Bull. Jpn. Soc. Fish. Oceanogr. 42:36-40. (Paper No. 3 of the 20th Symposium on the Tuna Fishery.) (Translated from the Japanese by Tamio Otsu, Transl. No. 89, 10 p.).

HONOLULU LABORATORY

INSULAR RESOURCES INVESTIGATION

Plans Developed for Submersible Research in Fiscal Year 1985

Dr. George W. Boehlert, Chief, Insular Resources Investigation, reports that four proposals have been submitted to the Hawaii Undersea Research Laboratory for use of the submersible, Makalii, in 1985. The proposals are entitled "Estimation of bottom fish catchability coefficients at French Frigate Shoals, Northwestern Hawaiian Islands," prepared by Dr. Stephen Ralston, Fishery Biologist; "Ecology of fishery resources of seamounts of the northern Hawaiian Ridge," prepared by Dr. Boehlert; "Observations on shrimp gear siting and shrimp behavior," prepared by Reginald M. Gooding, Fishery Biologist; and "Investigation of the ecosystem which develops around an artificial reef placed on Penguin Bank," prepared by Dr. Jeffrey J. Polovina. The proposals address a variety of topics including quantitative assessment of snappers and groupers, juvenile habitat, shrimp behavior in response to fishing gear, and development of fish communities around artificial reefs. The research is to be conducted at sites throughout the Hawaiian chain, from the Island of Hawaii to the seamounts near Midway.

Third Resource Assessment Survey of the Mariana Archipelago Completed

The third cruise in fiscal year 1984 for the assessment of the resources around the Mariana Archipelago was completed earlier this month. Robert B. Moffitt, Fishery Biologist, was Chief Scientist for this cruise on the Townsend Cromwell and was accompanied by five biologists from the Commonwealth of the Northern Mariana Islands (CNMI). The CNMI biologists surveyed the marine nearshore and terrestrial habitat of five of the more remote islands in the Mariana Archipelago. Moffitt reports finding small amounts of pink and black precious corals in 90-400 m (50-220 fathoms) of water around several of the northern islands. Also, excellent catch rates for wahoo, Acanthocybium solandri, were obtained from trolling around the islands.

Discussions on Artificial Reefs Held with Japanese Researchers

Dr. Jeffrey J. Polovina, Leader, Resource Assessment Investigations of the Mariana Archipelago Program, spent two weeks in Japan meeting with Japanese researchers who are involved in artificial reef research. During his visit, Dr. Polovina purchased a fiber glass reinforced plastic artificial reef module from the Asahi Chemical International, Ltd. These modules are used extensively in Japan. The module was loaded on the Townsend Cromwell, which was in Shimizu during the seamount workshop, for transport to Honolulu. The

module will be placed in Hawaiian waters to determine if it has the potential to increase the yield of commercially valuable bottom fishes.

Dr. Polovina also attended the seamount workshop during his visit to Shimizu.

Submersible Dive Data Analyzed

Reginald M. Gooding, Fishery Biologist, analyzed the video tape records and other data collected during five dives in the Hawaii Undersea Research Laboratory submersible, Makalii, off the Island of Hawaii. The dives were made to determine the factors that may be responsible for variation in the catch rates of deepwater shrimp. Heterocarpus ensifer, such as the behavior of shrimp, trap design, and the distribution and abundance of shrimp relative to bottom type. The results of the analysis will be included in a report being prepared by Mr. Gooding, Dr. Polovina, and Mr. Murray Daily, Director of Research, Hawaiian Shrimp Company.

FISHERY MANAGEMENT RESEARCH PROGRAM

Experiment Designed to Determine Optimum Escape Gap in Lobster Traps

Dr. Robert A. Skillman, Leader, Fishery Management Research Program, reports that an experimental design has been drafted to determine the optimum escape gap in lobster traps to reduce mortality caused by handling sublegal lobsters in the Hawaiian fishery. The experiment will consist of a laboratory phase to determine the optimum escape gap configuration, preliminary field trials on the Townsend Cromwell to confirm the laboratory findings, and field trials on board a commercial lobster boat to demonstrate the effectiveness of the escape gaps under commercial fishing conditions.

Honolulu Laboratory Researchers Participate in Planning Team Meetings

Dr. Skillman reports that researchers in the Fishery Management Research Program participated in meetings of the planning teams for pelagic management unit species and bottom fishes of the Western Pacific Regional Fishery Management Council. At the meeting on pelagic management unit species, Dr. Skillman reviewed several administrative reports that had been prepared for the Council. There was considerable discussion on the correlation study of fishing effort and catch per unit of effort in three Hawaiian fisheries and the Japanese longline fishery for these species.

Progress Made in Economics Research

Samuel G. Pooley, Industry Economist, reports that progress was made on the writing of draft reports of recreational fishing in Hawaii, responses on the price of bottom fish, and seafood markets in Hawaii. He also reports that Hawaii Opinion delivered their final field report on the longline and handline cost-earning survey. In other developments, proposals for the Hawaii recreational fishing evaluation study were reviewed and a contractor was tentatively selected. Dr. Robert Mendelsohn of Yale University has been selected as the summer faculty fellow in economic research at the Honolulu Laboratory.

PELAGIC RESOURCES INVESTIGATION

Bigeye Tuna Tracked for 27 Hours

Dr. Richard W. Brill, Leader, Experimental Ecology of Tunas Program, reports that Dr. Kim Holland, Hawaii Institute of Marine Biology, University of Hawaii (UH), Lt. (jg) Scott Ferguson, NOAA Corps, and research assistant Gregory M. Weber successfully tracked a bigeye tuna, Thunnus obesus, for 27 hours. The fish was caught on the morning of February 29 near fish aggregating device, "S", off Oahu. After the fish was released, it swam almost due west for the entire duration of the track. The track was terminated when the fish reached a point approximately 27 miles from Oahu. This is the second tracking of a bigeye tuna. The first tracking was in 1982 off the Kailua-Kona coast. The swimming depth behavior of this bigeye tuna was almost identical to that of the first bigeye tuna that was tracked. At one point, however, this second fish demonstrated one of the most remarkable changes in depth ever recorded for tuna. The fish literally dropped from a depth of approximately 100 m to over 360 m in less than one minute.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT

Larval Abundances of Rockfishes Studied

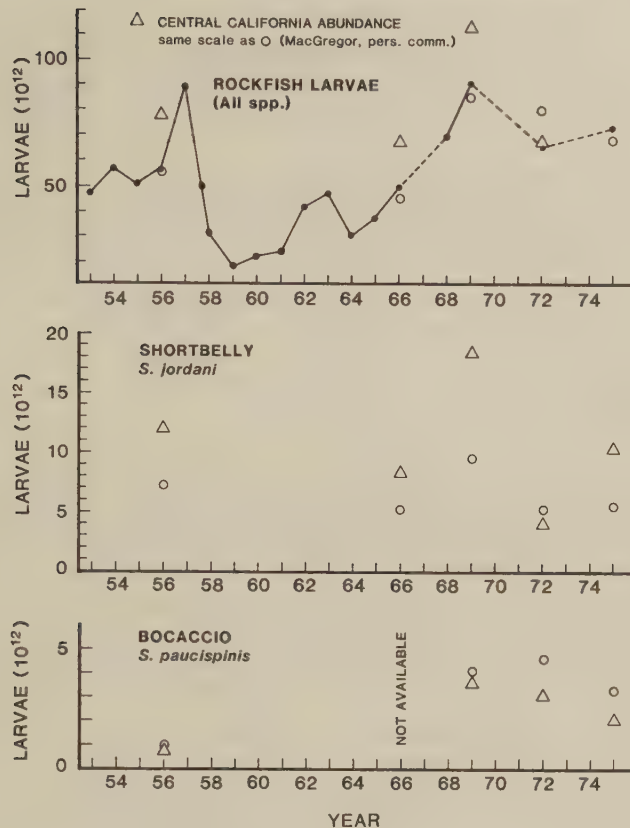
Some of the more pelagic rockfishes such as shortbelly (Sebastes jordani), bocaccio (S. paucispinis), and chilipepper (S. goodei) potentially interact with pelagic surface fishes such as anchovy and sardine. To determine if changes in larval abundances of pelagic rockfishes have been associated with changes in anchovy and sardine larval abundances, Dr. Alec MacCall, Fishery Biologist, has constructed a time series of rockfish larvae.

In CalCOFI Atlas 26, Ahlstrom, Moser and Sandknop calculated average larval abundances for 23 standard stations in southern California from 1950 to 1975. From the Atlas, Dr. MacCall prepared an index of abundance for southern California. John MacGregor, Fishery Biologist, (manuscript in review) has calculated more detailed censuses for rockfish larva during 1956, 1966, 1969, 1972 and 1975. Mr. MacGregor's data also include separate censuses for two pelagic species, shortbelly and bocaccio. The southern California index was scaled to MacGregor's censuses, putting all estimates on comparable scales.

The results show some interesting and unexpected relationships. Mr. MacGregor's data for central California show no trend in larval abundance, but the more complete southern California time series shows three distinct segments. The early and later segments appear fairly stable, with a suggestion of higher abundance for the later segment. The anomalous middle segment was initiated by the El Nino of 1958-59, when larval abundances dropped severely. Curiously, abundances did not recover for ten years. It is unclear to what extent the depressed larval abundances were due to decreased adult abundance or to decreased fecundity of those adults. It may be worthwhile to monitor annual changes in abundance of larval rockfish following the El Nino of 1982-83, with ancillary sampling of adults to monitor fecundity of some of the species (see following Figure).

• SOUTHERN CALIFORNIA ABUNDANCE (scaled to MacGregor's abundance)
based on 38 standard stations (modified from Ahlstrom et al 1978 Table 6)
CalCOFI Atlas 26.

○ SOUTHERN CALIFORNIA ABUNDANCE (MacGregor, pers comm)



There is no trend in abundance of shortbelly larvae, despite large changes in larval abundances of potentially competing anchovy and sardine. Bocaccio are much larger, and are more likely predators rather than competitors. Abundance of bocaccio larvae appears to parallel changes in anchovy larvae, although the mechanism is not clear. Thus, this attempt to include rockfishes in the assemblage of California Current pelagic species does not provide a "missing link" in the ecosystem, but does add a new and interesting dimension to the already complicated multispecies relationships among the more traditional pelagic species.

Paper on Rockfish Completed

During March, fishery biologist John MacGregor finished a rough draft of "Growth of nine species of rockfishes (Sebastes)." The von Bertalanffy growth curve shows a pattern of deviations of observed lengths (back calculated) from calculated lengths that indicates that the curve does not quite describe the growth of fishes. Roughly, the first 10% of the curve has negative values, the next 30% positive, the next 40% negative, and the final 20% positive.

For the greenstriped rockfish, for which Mr. MacGregor had the most age groups, the pattern is not only present in the growth curve for all 13 ages, but also in ages 1 through 7 and 7 through 13 when treated as separate series. This pattern is found in other rockfish as well.

However, the deviations only amount to a few millimeters and are not of vital importance. Use of a third degree power curve to describe growth tends to decrease the total deviation somewhat, but does not get rid of the pattern of deviations.

Report on Supply and Demand of Fishmeal Completed

Economist Cindy Thomson completed an Administrative Report entitled, "A model of fishmeal supply and demand in the United States, 1966-1981." The five equation model includes behavioral equations for demand, imports and exports, and a price adjustment equation. Parameter estimates are based on monthly data for the period January 1966 through December 1981. Analysis of covariance was used to test for differences in market structure before and after the 1972 El Nino, which caused a dramatic decline in Peru's production and export of anchoveta meal and a corresponding decline in U.S. imported supplies. Parameter estimates confirm the a priori expectation that the elasticities of demand with respect to fishmeal and soybean meal prices are lower after the El Nino than before. The model also suggests that, even if world fishmeal supplies were to return to pre-El Nino levels, U.S. feed mixers are not likely to return to old (high utilization) patterns of consumption.

Also included in the report are tables describing annual historical changes in fishmeal production, and imports and exports, graphs depicting monthly movements in fishmeal and soybean meal prices, mixed feed consumption, fishmeal production, imports and exports, and annual soybean meal production and exports, and a general analysis of model stability.

Ms. Thomson produced, "A report on the 1981 PACFIN research data base" with Dr. Daniel Huppert and Susan Iacometti. The report describes the contents of the Annual Vessel Summary File, which contains more than 15,000 records--one for each commercial fishing vessel (identifiable by Coast Guard or State Marine Board number) that landed fish on the Pacific Coast in 1981. Each record describes a vessel's physical characteristics, ports of landing and gear type used, total ex-vessel value of landings, and annual landings of 43 species categories in 1981. It also contains the number of fish tickets recorded for the vessel (by state) and information on the vessel's "principal" port, gear and species group.

The report also contains descriptive summaries of the File. These include, but are not limited to: (a) a breakdown of landings by species and state, (b) frequency distributions of vessel length and annual landed value, and (c) tables summarizing the number of vessels engaged in inter-state fishing activity, fishing various combinations of species and gear, and

associated with selected principal species, gears and ports. Included in the Appendix are average prices by species and state, calculated on monthly and annual bases.

Nonscientific Problems Examined in Fisheries Resource Management

Dr. John Pringle, on sabbatical leave from the Halifax Fisheries Research Laboratory in Canada, has written two manuscripts which support Walker's (1973) hypothesis that the basic flaw in scientific resource management is that "it is founded on an understanding of the natural system and not the human system." Cushing (1974), in contrast, argued that failure in resource management was often due to poor science. Many fisheries in North America have experienced poor resource management in spite of the availability of good science.

One problem highlighted in the manuscripts is the generally poor relationship between fisheries scientists/managers and fishermen. Dr. Pringle claims that too often the scientists suspect the fishermen of having little regard for the resource, and thus, the future of the fishery. This attitude may cloud the professional's objectivity and adversely influence his approach to fishermen until a confrontational atmosphere develops. At this point, no matter how good the science, management plans will be rejected on principle by the fishermen.

Examples from Dr. Pringle's experience with inshore fishermen in eastern Canada and the experience of others involved with the California fisheries (McEvoy 1979 and Anonymous 1982) demonstrate that the majority of fishermen are sincerely concerned about conservation of the resource. The author recommends a forum where scientists, resource managers and industry representatives can frequently meet. Here, the science deemed important for resource management should be presented in a fashion intelligible to the layman. With patience, confidence in each other would develop. Ultimately, the good science would be accepted by the fishermen.

Another problem in fisheries conservation that the author describes is the structure of the resource management agency. The author traces the overcapitalization of the eastern Canadian Irish moss (Chondrus crispus) fishery and the collapse of the California sardine industry. Assessment science and resource development in both countries were within separate, autonomous agencies. In theory, resource management in its broadest sense ("everything done to maintain or improve fisheries resources and their utilization," Alverson and Paulik, 1973) requires the harmonious interaction of the two agencies. Yet, this did not appear to happen even when the two agencies were within the same level of government (federal in Canada); when two levels of government (federal and state in the United States) were involved the chances were even more remote.

To avoid the problems inherent in multi-agency, resource management structures, the author suggests that all functions could be placed in one agency. This may not be possible due to constitutional allocation of

resources to separate levels of government. Where this is the case, the problem can be resolved by other measures. The formation of the California Cooperative Oceanic Fisheries Investigation (CalCOFI) group, made up of scientific delegates from the state and federal fisheries agencies and universities, is an example. Here, scientific opinion on resource based matters can be vetted from all sides which should result in better resource management plans and resource development schemes.

COASTAL AND PACIFIC FISHERIES RESOURCES INVESTIGATIONS

Workshop on Climatic Variability

Dr. Roger Hewitt attended a workshop on climatic variability from March 4 to 8, which was organized by Chris Mooers (Navy Post-Grad. School) and U.S.G.S. Long-range plans of the workshop are to produce a monograph describing climatic variability and its correlates over the western portion of the Americas and the eastern portion of the Pacific Basin. The workshop was attended by atmospheric and ocean scientists, meteorologists, hydrologists, glaciologists, terrestrial and ocean biogeographers and assorted synthesizers.

During this 4-day session available data bases were described; climatic regimes were outlined; physical correlates and biological responses were enumerated. All participants summarized their comments, and the workshop sessions were recorded in order to prepare a syllabus of the workshop. Additional sessions are planned.

During the workshop, Dr. Hewitt described the CalCOFI data bases and what he believes to be the dominant signals observed. The dominant biological signal in the CalCOFI data is the north/south shift in oceanic zooplankton distributions with warm/cold years. Superimposed on these distributions are those of coastal species including the major ichthyoplankton constituents. The most pronounced signal (either physical or biological) documented by the CalCOFI data set is the later portion of the decline of the Pacific sardine and the increase of the northern anchovy populations. Although both events are evident in the 35-year time series, there is no reason to conclude that either population had any direct effect on the other. Anchovy population growth is weakly correlated with temperature, although it is negatively correlated with successive warm years according to Dr. Paul Fiedler.

Associated time series include a 5-year (1978-1982) series, compiled by Dr. Richard Methot, describing the seasonal distribution of reproductive success for the anchovy population, monthly collections over a 3-year period (1977-1979) of nearshore ichthyoplankton by Dr. Gary Brewer of USC and associates and a 4-year series (1980-1983) of high-precision estimates of egg production and adult fecundity for the anchovy population.

SURVEY SYSTEMS DEVELOPMENT AND EVALUATION

CalCOFI Data Furnished to Mexican Graduate Student

During the week of March 12, Dr. Paul Smith assisted Michal Dreyfus, graduate student from CICESE in Ensenada, Baja California, Mexico, to gain access to historical data from the CalCOFI biological and oceanographic data bases using DEC command language and DATATRIEVE procedures on the UCSD VAX computer. In total, they retrieved 369 files (in excess of 7.5 million bytes containing mostly sized anchovy larval data and data on functional groups of invertebrates and 10-meter salinities.

Oceanographer Larry Eber provided a program to transfer the files to tape for transport to Ensenada, which facilitated the task of dealing with a large number of diverse file names by means of a file created with the VAX directory utility.

Thirty-Year Record of Zooplankton Taken by CalCOFI Furnished to Oregon State Researcher

At the request of Professor Dudley Chelton of OSU, Dr. Paul E. Smith prepared 28 larval files containing zooplankton data and associated environmental data. The files were prepared using DEC Command and DATATRIEVE procedures, which had been written by Michel Dreyfus and Paul Smith for the UCSD VAX. The records contained 2.3 megabytes of information desired as a subset of the 30 megabyte historical files.

The Chelton request originated in a meeting on climatic change held in Monterey earlier this month by terrestrial, meteorological, and oceanographic scientists led by Dr. Chris Mooers.

Oceanic Fisheries Resources Division

TUNA AND BILLFISH RESOURCES PROGRAM

SWFC Scientist Participates in Joint Japanese-U.S. Tuna Research

Dr. Norm Bartoo, Fishery Biologist, completed a two-month stay at the Far Seas Fisheries Research Laboratory (FSFRL) in Shimizu, Japan. During the visit several research projects on North Pacific albacore were undertaken. An evaluation and correction of both the FSFRL and La Jolla data sets for North Pacific albacore were done. This was the first time a common and corrected data set for North Pacific albacore has been prepared. A production model

analysis including a Monte Carlo simulation to evaluate the effects of errors in input data was completed and documented in a paper which Dr. Bartoo coauthored with Mr. T. Shiohama, FSFRL. This paper will be submitted to the FSFRL fisheries journal.

Additional activities by Dr. Bartoo during the visit included a talk at the Japan Tuna Conference on the United States albacore fishery and a seminar on applications of the Monte Carlo simulation technique to fisheries problems presented to scientists at the FSFRL. He prepared a manuscript on the United States albacore fishery for inclusion in the proceedings of the tuna conference and conducted a production model assessment and investigation of longline catch-per-effort adjustment methods for Atlantic bigeye tuna stocks. With coauthor Mr. S. Kume, Dr. Bartoo prepared a document for the upcoming meeting of the International Commission for the Conservation of Atlantic Tunas.

Progress Made in Development of North Pacific Model

The Albacore Modeling Group (Pierre Kleiber, Earl Weber, and Sue Chivers) has completed a draft of a report which documents the data processing and the data sources required for producing an albacore catch and effort data base suitable for use with the albacore model. The group is now redoing the data base, both to correct mistakes that became obvious in preparing the report and to incorporate a revised set of Japanese albacore fishery statistics expected soon.

Recruitment is a necessary input variable for the albacore model. The group hopes to drive the model with a series of recruitment estimates for the years for which suitable catch and effort statistics are available. They plan to estimate recruitment in two ways. One method to estimate recruitment is cohort analysis, which requires conversion of catch-at-length data to catch-at-age. To do this conversion, they need to know the relationship between length and age. The other method for estimating recruitment is to use a length structured analytical model, which they have developed. The computer algorithm for fitting the model is being developed by Roy Mendelssohn of the Pacific Environmental Group. This method uses the catch-at-length data directly, but the relationship between length and growth rate must be known.

Both of the above methods are sensitive to the fact that the growth rate can be variable for a given length, and hence age can also be variable for a given length. To better understand the relationship between size and age when growth is variable, Dr. Kleiber constructed a model which explicitly tracks size and age for individual fish in the model. Three basic types of variation in growth are incorporated into the model: 1) inborn variation from the norm that an individual carries for life; 2) variation with time from the norm for the whole population; 3) additional variation with time for each individual. Using this model they have generated catch-at-length data which are being used to test both of the above methods of estimating recruitment by seeing how well the estimated recruitments match the recruitment levels that were set in the model.

Record Number of Billfish Tagged in 1983

A record number of billfish were tagged in 1983 by anglers under the auspices of the Cooperative Marine Gamefish Tagging Program coordinated by fishery biologist James Squire. Two records were set: 189 blue marlin were tagged about the southern tip of Baja California, and a total of 226 striped marlin were tagged and released off southern California.

Changes in the distribution patterns of blue marlin in the eastern Pacific during the recent El Nino resulted in the finding of large numbers of these fish about the tip of Baja California, Mexico. Also, warm sea-surface temperatures off southern California resulted in a concentration of striped marlin in the area south of Pt. Conception (Santa Barbara Channel Island southeast to Santa Barbara Island) where excellent catches were made.

A total of 1,995 fish were tagged in 1983, which was an increase of 952 fish tagged over 1982. The number of billfish tagged totaled 1,214 and was composed of 762 striped marlin, 232 blue marlin, 17 black marlin, 191 sailfish and 1 marlin of unknown species.

Twenty-one billfish tags were returned in 1983. The tags were from 19 striped marlin, 1 blue marlin, and 1 sailfish. A number of tagged mako sharks and yellowtail were recovered in New Zealand and will be reported by the New Zealand Ministry of Agriculture and Fisheries.

Progress Reported in mtDNA Studies

Work in the mitochondrial DNA (mtDNA) lab during the last several months has focused on perfecting techniques in preparation for large-scale production analysis runs. Although fishery biologists John Graves and Andrew Dizon have successfully carried out the complete procedure, the percentage of successful ones was low. The whole analysis is long and complex: (1) preparation of genomic DNA (includes 99% nuclear and 1% mitochondrial DNA), (2) digestion into fragments of genomic DNA with restriction endonucleases, (3) electrophoresis of fragments of the DNA on gels of agarose, (4) transfer of the fragments to nitrocellulose, (5) hybridization of the DNA fragments on the nitrocellulose with radioactively labeled pure mtDNA (from a close relative), and finally, (6) autoradiography of the hybridized nitrocellulose filter. The latter two steps enable visualization of the mtDNA from the nuclear DNA of the original sample; the radioactively labeled pure mtDNA only attaches to the mtDNA in the sample because the two mtDNA's have about 90% sequence similarity.

Somewhere in the chain of procedures was a step, or several, responsible for the low success rate. After about a year of trial-and-error testing (and with the advice of experts in the field), the investigators narrowed down the problem to the hybridization step. The problem appeared to be an incredibly simple one to correct; it seems that insufficient amounts of hybridization fluid were being added. (Established protocols were always vague about the amount to add; our consultants said "around" 5 ml.) When more fluid was added

or when a smaller filter was used, the final result was a clear, readable autoradiograph. With insufficient amounts, the autoradiograph was blotchy, with certain fragment bands visible and other bands not visible. With this understanding, the investigators will try to rehybridize, with new radioactive probe, some of the old nitrocellulose filters which were thought to be useless.

Another problem facing the investigators was a limited supply of fresh cetacean tissue from which to make pure mtDNA to label radioactively for use as the recent hybridization "probe." Liver tissue, which must be taken from a recently deceased animal, is used to make the mtDNA. Over the past two years about 400 grams of liver tissue was obtained that was useful for extracting pure mtDNA, although only nanogram quantities can be obtained from gram amounts of liver.

To alleviate this problem, Dr. Sharka Lucas, Scripps Institution of Oceanography, is attempting to clone the 16,000 nucleotide-pair cetacean mtDNA molecule. A sample of pure mtDNA is "ligated" into a plasmid (a DNA-containing bacterial organelle) which *E. coli* cells are then induced to take up. Once inside, the plasmid with the mtDNA insert will then be perpetuated in the particular strain of *E. coli*.

When cetacean mtDNA is needed to label radioactively for the hybridization step, several liters of the *E. coli* strain are grown, and the plasmid is extracted and directly labeled with radioactive phosphate. It does not matter that the plasmid's original DNA is present along with the cetacean mtDNA insert. The presence of the mtDNA is important because it alone will hybridize to the sample of cetacean mtDNA to indicate its presence.

Supporting the scientific dictum that "nothing is ever easy," the first attempts at inducing the bacteria to take up the plasmid with an insert of the whole piece of cetacean mtDNA resulted in no cell survival. Although this process works with mouse mtDNA, some protein produced by the plasmid with the whole insert of cetacean mtDNA is toxic. Inserts of whole human mtDNA in the plasmid the investigator is using are also toxic. The investigators will try a different plasmid. So far a strain of bacteria has been produced which harbors a 5,000 nucleotide fragment of the 16,000 nucleotide DNA. Work is proceeding on cloning the rest.

1983 U.S. Tuna Receipts Tallied

According to industry economist Sam Herrick, data compiled by the Market News Service of the National Marine Fisheries Service's Southwest Region indicate that overall U.S. cannery receipts (imports plus domestically caught fish) of albacore, bigeye, skipjack and yellowfin tuna for 1983 rose 7% from 1982. Total skipjack cannery receipts for 1983 were up 26% from 1982, while total albacore, bigeye and yellowfin tuna receipts for 1983 declined 18%, 4% and 5% respectively from 1982. Reported quantities of imports and domestically caught tuna received at major U.S. processing sites during 1982 and 1983 are presented in the accompanying table.

Table 1. U.S. Tuna cannery receipts by species, site and source, January 1 through December 31, 1982 and 1983.

Species	Site	Source	Quantity 1982 (S. tons)	Quantity 1983 (S. tons)	Per. chg. 1982-83
ALB	PR	I	60669	50104	- 17
ALB	PR	D	0	4	100
ALB	AH	I	22811	17135	- 24
ALB	AH	D	1866	1032	- 44
ALB	CN	I	11116	5617	- 49
ALB	CN	D	5097	9437	85
SUBTOTAL			101559	83329	- 18
BIG	PR	I	1470	1775	20
BIG	PR	D	209	791	278
BIG	AH	I	2675	2741	2
BIG	AH	D	0	0	0
BIG	CN	I	65	0	-100
BIG	CN	D	1087	2	- 99
SUBTOTAL			5506	5309	- 4
SJK	PR	I	81270	84668	4
SJK	PR	D	19691	41608	111
SJK	AH	I	8730	9183	5
SJK	AH	D	26597	54909	106
SJK	CN	I	37112	41450	11
SJK	CN	D	56168	58531	4
SUBTOTAL			229568	290349	26
YFN	PR	I	31296	22321	- 28
YFN	PR	D	25018	29252	16
YFN	AH	I	6965	6925	0
YFN	AH	D	13924	23293	67
YFN	CN	I	8000	4414	- 44
YFN	CN	D	75891	66070	- 12
SUBTOTAL			161094	152275	- 5
TOTAL			4997727	531262	7

Species: ALB = albacore; BIG = bigeye; SJK = skipjack; YFN = yellowfin.

Site: AH = American Samoa/Hawaii; CN = Continental; PR = Puerto Rico.

Source:, D = domestically-caught; I = imports.

MARINE MAMMAL BIOLOGY

Analyses Begun on Tetracycline-labeled Dolphin Teeth

Dr. Al Myrick, Project Leader for Marine Mammal Age Determination, reports that he has begun photographing, mapping and analyzing the layer patterns in teeth from captive bottlenose dolphins that were repeatedly given injections of tetracycline during a three-and-a-half-year period. Upon being introduced into the blood, tetracycline combines with the calcium component of the formative dentinal and cemental layer in the teeth. Ultraviolet-light microscopic examination of the thin sections of the tooth reveals the tetracycline label as a tiny fluorescent band within the layered tissues.

Almost every three months during the period, each of 12 bottlenose dolphins was given tetracycline at Sea World's three parks (San Diego, California; Cleveland, Ohio; and Orlando, Florida). To ensure that no mistake occurred and that the experiment's progress could be traced physically through time, a tooth was extracted from each animal about every six months.

While the primary purpose of Dr. Myrick's study is to define and calibrate the layering patterns for use in age determination of wild-caught dolphins, it may be possible to accomplish much more. Dr. Myrick believes that at least some of the incremental layers may be records of various behavioral, physiological, or exogenous events or activities. To investigate some of these possibilities, the study data included weekly water temperature and salinity measurements, records of food consumption, including changes in types of food, trimonthly body-length and weight measurements, and a weekly monitoring of behavior, activity, and handling of each animal. In order to determine whether any of the factors to be tested influence or alter the layering patterns, tissues deposited during the dates that substantial changes occurred will be identified by looking between appropriate labels. If such a factor or factors can be identified by pattern changes, it may eventually be possible to draw inferences about conditions or events operating on dolphins in the wild simply by identifying pattern changes in the layers of their teeth.

Analysis Completed of Sexual Maturity in Male Spotted Dolphins

An analysis of sexual maturity based on histological examination of testis tissue has been completed by zoologist Aleta Hohn and computer assistant Susan Chivers for a sample of 269 spotted dolphins from the eastern tropical Pacific Ocean. An important part of the study was the development of an indicator of sexual maturity that could be used for other spotted dolphins without depending on histology and that might be applicable to other species of dolphins as well. The "Index of Testis Development," which is the right testis weight divided by right testis length, was used successfully to separate immature, pubertal, and mature specimens with little overlap between successive maturity stages. The mean index values are: immature - 0.19,

pubertal - 0.47, and mature - 1.93. However, the median index value is 0.33 at attainment of puberty and 0.75 at attainment of sexual maturity. Additional studies will be undertaken to determine if the same index values can be applied to other species to indicate maturity.

Computer-based Osteological Specimen Catalog Developed

Dr. William Perrin, Supervisory Fishery Biologist, reports that a marine mammal osteological specimen catalog system has been developed and implemented on the La Jolla Standard Microcomputer. The system includes information on specimen location (e.g., on-site freezers, commercial freezing plants, museums), specimen status (e.g., frozen, predated), disposition of specimens or their associated parts (e.g., contracted, loaned, donated) plus life history information on the specimen when the data is available. Besides performing usual editing functions like adding, and changing or deleting records, the system can generate a set of reports, which meet certain conditions, providing summaries for all catalogue data and lists of specimens and parts. For example, a report organized by species type or a listing of parts on loan could be generated.

As new data for a specimen are obtained or specimens are moved, the old records are written to a historical data base. This historical data base will be used as a reference file and in some cases will prove useful in tracking down lost parts. Computer programmers Jay Walker and Eugene Sibbald wrote the dBase II procedures for this system.

University of Montana Scientist Presents Series of Lectures on Population Dynamics

Dr. Dan Goodman, University of Montana, gave a series of five lectures March 19-23 covering applied uses of population dynamics and population modeling. The lecture series are part of a contract which Dr. Goodman has with the SWFC to develop a new assessment procedure for pinnipeds where data on historical take does not exist. The purpose of the lecture series was to bring all of the fishery/wildlife biologists in the Coastal Marine Mammal Project up to date on a new assessment procedure, called the dynamic response method that is currently being developed by Dr. Goodman and Dr. Douglas DeMaster.

Dr. Goodman's first lecture developed the discrete form of Lotka's equation from the continuous form. It also described the two basic approaches for estimating the annual rate of population change. Finally, the assumptions concerning the age structure of a population that are necessary to apply Lotka's equation were discussed. The second lecture dealt with the problem of parameterizing the geometric series model so that the estimated rate of increase was identical to the estimated rate of increase from Lotka's model. In addition, a number of different methods for estimating the annual rate of survival were discussed. The third lecture dealt with the use and parameterization of an extended Leslie model. This model assumes reproduction is age specific up to a certain age, and thereafter remains constant. It

further assumes that the adult survival rate is constant. This model was presented as one of the more reasonable population models in light of the data it requires. The fourth lecture dealt with a comparison of various fishery production models in terms of their density-dependent functions. Finally, these models were compared with the models used in interpreting the dynamic response method. The final lecture was an open discussion about the use of various statistical procedures in analyzing existing data.

MARINE MAMMAL STOCK ASSESSMENT PROGRAM

Final Meeting of Pre-Sops Panels Held

Members of the SWFC pre-SOPS Panel C met on March 1 and 2 to review papers documenting research on abundance of dolphin associated with the purse seine fishery for tuna in the eastern tropical Pacific Ocean (ETP). The meeting, chaired by fishery biologist Wes Parks, was the third in a series of three by this Panel. The meeting was the last in a larger series of 10 meetings by four panels.

The 10 meetings were part of continuing research directed at increasing understanding of the biology and abundance of dolphin associated with the tuna fishery in the ETP. The objective of the research is to provide estimates of the status of stocks of these dolphin for possible use in an environmental impact statement to be issued in conjunction with regulations governing the taking of dolphin in association with the U.S. fishery in 1986 and beyond. Each of the four panels reviewed papers treating detailed aspects of dolphin biology in one of four subject areas: (1) distribution of dolphin in the ETP, (2) vital rates, (3) abundance, and (4) mortality of these dolphin.

As a group of related papers on each of the four topics was completed, meetings of panels were convened to review the scientific merits of the research presented. Panels were composed of experts in the biology of marine mammals and in the analytic techniques used. Panel members were chosen from the NMFS, other U.S. and international agencies, private research organizations and from academic institutions.

The Panel C meeting on abundance reviewed three papers on research pertaining to estimating abundance of dolphin. In "Analysis of the relationship between the distribution of searching, tuna catches and dolphin sightings within individual purse seine cruises" by Dr. Tom Polacheck, the searching and encounter process within individual fishing trips was examined for evidence of clustered searching and clustered distributions of schools of dolphin and tuna.

In "Encounter rates with schools of the spotted dolphin in the eastern tropical Pacific" by Dr. Polacheck, encounter rates for U.S. seiners were examined for information on spatial and temporal abundance of this species.

In "Estimates of abundance of dolphin stocks taken incidentally in the ETP yellowfin tuna fishery" by Dr. Rennie Holt, estimates of abundance as well as estimates of parameters and procedures used to estimate abundance were presented.



Participants at a Pre-SOPS Panel C-3 meeting on abundance were from left to right: Mr. Gordon Broadhead of LMR, Inc.; Dr. Phil Hammond, IATTC; Dr. Ken Burnham, North Carolina State University; Dr. Andrew Dizon, Oceanic Division; Dr. Rennie Holt, Oceanic Division; Dr. Jay Barlow, Oceanic Division; Dr. Douglas Chapman, Marine Mammal Commission; Dr. Wesley Parks, Oceanic Division. Panel members not shown in the photograph were Dr. Martin Hall, IATTC and Dr. Tom Polacheck, Oceanic Division.

Hydrodynamic Performance and Thermoregulation in the Spotted Dolphin Investigated

Morphological measurements of four spotted dolphin (Stenella attenuata) ranging in size from 81 to 189 cm provided parameters for estimating heat flux as a function of size in these small tropical cetaceans. NRC Research Fellow Dr. Elizabeth Vetter notes that estimates of heat generated by standard metabolism, specific dynamic action, and observed average swimming speeds are nearly identical to estimates of surface heat loss for all sizes of Stenella attenuata at the temperature (27°C) where the dolphins most commonly occur. Reasonable estimates of ration (ranging from 12% in neonates to 5% in adults) can provide sufficient internally generated heat to cover minimum unavoidable heat losses at 27°C, estimated based on surface dimensions and blubber depths.

The severity of hydrodynamic and thermodynamic constraints varies inversely with dolphin size. Changes in the relative proportions of muscle and fat (Figure 1) can partially compensate for the thermodynamic disadvantages faced by the smaller dolphins with their larger surface to volume ratio. Muscle mass was relatively smaller in the 81 cm dolphin compared with the adult (34% vs. 55%). This decrease in heat-generating machinery was offset by a concomitant increase in relative blubber depth. Blubber increased from 15% to 25% of body weight, and from 14% to 27% of cross-sectional area with decreasing size from 190 to 81 cm. Power requirements predicted by the hydrodynamic models, compared with the probable power output of dolphin muscle, indicate that smaller *Stenella attenuata* may be physiologically incapable of maintaining sustained speeds in excess of 3-5 knots for more than a few minutes when depending only upon their own musculature for power (Figure 2). The commonly observed habit of "drafting," in which young (small) animals appear to gain a hydrodynamic advantage from swimming very close to larger, more powerful dolphins is theoretically the mechanism by which the smaller animals are able to keep up with the herd during periods of high-speed swimming. The positive advantage to the smaller animal and the negative advantage to the larger animal, at different speeds and proximity, should be estimatable based on measurements of body dimensions, aerial photographs of school formation, and observed swimming speeds. Body and fin dimensions and muscle weights could be used to predict power/time curves as a function of size for *Stenella attenuata*. These predictions could be tested with existing data relating school composition to duration of sustained swimming.

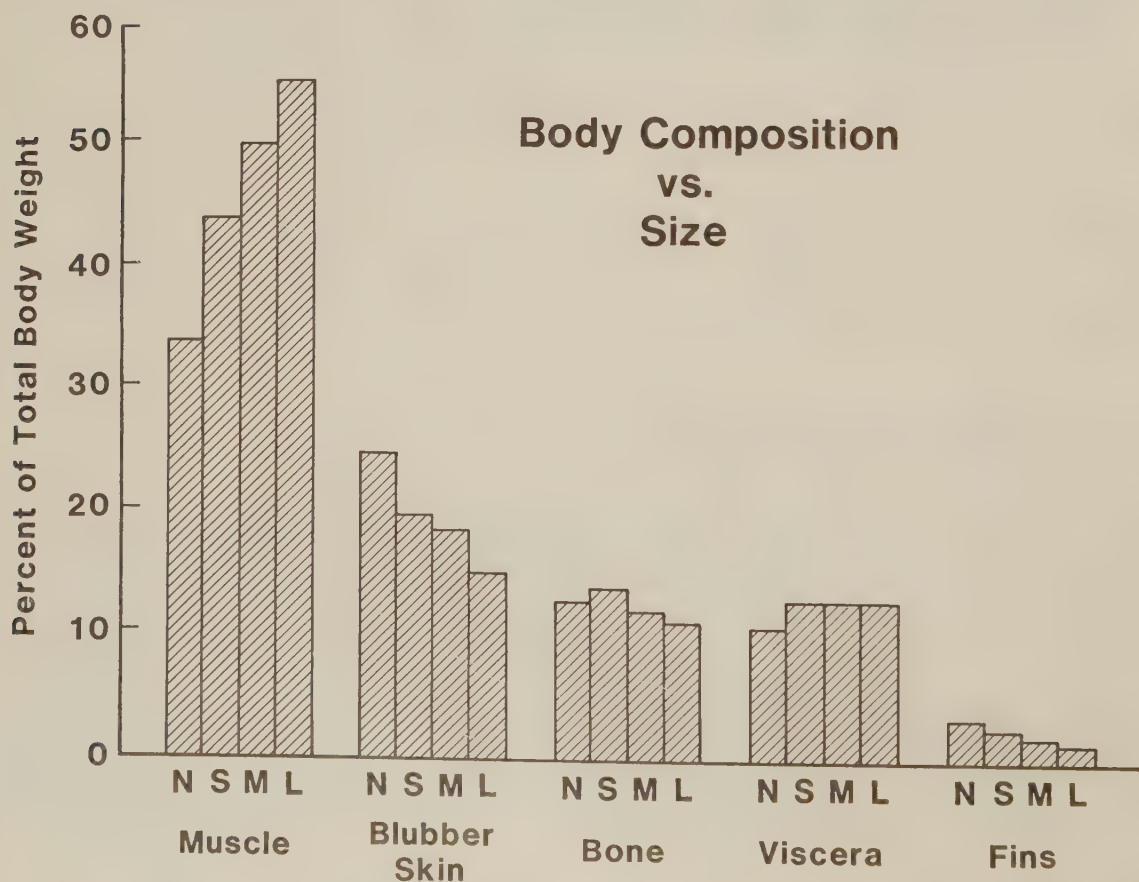


Figure 1. Relative proportions of body mass in four *Stenella attenuata* from eastern tropical Pacific Ocean. Letters on abscissa refer to neonate (81 cm), small female (114 cm), medium male (136 cm), and large female (189 cm).

WHAT DOES IT COST TO SWIM ?

	CM x SEC ⁻¹	WATTS x KG MUSCLE ⁻¹	PERCENT BODY WEIGHT x DAY ⁻¹
NEONATE	100	2	1
	200	11	6
	300	33	18
	400	73	40
	600	227	124
SMALL FEMALE	100	1	0.5
	200	5	4
	300	16	11
	400	35	25
	600	109	76
MEDIUM MALE	100	0.5	0.4
	200	4	3
	300	11	9
	400	24	19
	600	76	60
LARGE FEMALE	100	0.4	0.3
	200	2	2
	300	8	7
	400	17	15
	600	53	46

(—————> Speed balances heatloss)

Figure 2. Weight-specific costs of swimming (Watts x KG muscle⁻¹) and the daily ration (% body weight x day⁻¹) needed to support those speeds in four *Stenella attenuata* from the eastern tropical Pacific Ocean. Weight-specific costs were estimated based on muscle masses of 1.9KG, 7.2Kg, 15Kg, and 40Kg in the neonate (81 cm), small female (114), medium male (136 cm) and large female (189 cm). Watts were converted to ration assuming a caloric density of 1.5 Kcal/g wet weight dolphin.

Thermodynamic considerations predict that metabolic compensation, increased activity level, and/or thicker insulation would be necessary for *Stenella attenuata* to persist in colder water. Estimates of rations sufficient to sustain thermoneutrality in the face of surface heat loss become unrealistically high for water temperatures much below 24°C, implying that thermodynamic constraints may be one of the mechanisms limiting the range of this species.

Analysis of insulation (blubber) depth versus size in 72 additional *Stenella attenuata* from the ETP corroborates the blubber dynamics found in the primary four *Stenella attenuata*. Relative blubber thickness is high in neonates, decreases with increasing size until the onset of sexual maturity, and then increases again, slightly sooner in females than in males. Body dimensions and records of ambient temperature can be used to predict minimum insulation (blubber depth) needed to maintain thermoneutrality. Comparisons

of these blubber depths with insulation observed in field populations may provide an index of population condition.

Staff of New Research Task Samples Squid Populations

A new research task within the Oceanic Division of the SWFC has been organized to assess pelagic resources. The task is led by Dr. Steve Reilly, Operations Research Analyst, and includes John Hedgepeth, Fishery Biologist, and Hannah Bernard, Biological Technician. Other OFRD staff are also involved with the task including Drs. Tim Smith and Jay Barlow. The group is especially interested in developing stock assessment tools which utilize information on interactions between target (fisheries) species, and upper-trophic-level, nontarget species. They are also interested in clarifying the ecological bases of the interactions of multispecies groups of pelagic predators.

For the present, they are focusing primarily on the eastern tropical Pacific, and on animals related to the tuna-dolphin aggregations. Epipelagic squids (predominantly ommastrephids) are consumed by the birds, dolphins and fishes of these aggregations, and probably by most of the upper-level predators of the region.

To estimate biomass of all epipelagic (and/or mesopelagic) cephalopods in an area, directed surveys combining acoustic and some type(s) of capture-oriented methods will probably be necessary. Less elaborate (and less expensive) methods may suffice, if the studies target particular types of squids, and are restricted only to indexing abundance. In indexing abundance a method which samples the target populations representatively is needed.

At present there are no methods known to be generally effective for sampling the abundance of pelagic cephalopods. Net tows, a biological oceanographer's standard sampling tool, capture some species and age classes, but not others. The same is true for any other sampling method currently available. A recent volume of Biological Oceanography, which focused on micronekton sampling, included a number of papers detailing the problems in assessing squid abundance. The most promising research approach seems to be identification or development of methods focused on specific assessment situations.

In the North Pacific the Japanese successfully conduct a large commercial fishery for ommastrephids using automatic jigging machines so there is reason to believe that ommastrephids (at least some types) can be sampled effectively with such machines. When the opportunity occurs, Dr. Reilly and his associates have been testing the feasibility of automatic jigging machines for use as a tool to index the abundance of epipelagic squids in the eastern and central tropical Pacific. We have also had the opportunity to arrange the testing of a machine in the Antarctic.

One automatic jigging machine is currently at sea aboard the NOAA Ship Discoverer in the central tropical Pacific. Moderate capture success has been reported by Robert Pitman of the Los Angeles County Museum who is operating

the machine for the SWFC. Because the ship is on an acid rain cruise, opportunities to run the squid jigging operation arise infrequently. The jigging machine was also tested on the previous cruise of the Discoverer which was part of the EPOCHS expedition series. On that cruise, attempts were thwarted by logistic conflicts between the deployment of the jigging machine and the CTD. The jigging machine has been repositioned for the current cruise, and apparently is not entangled with the CTD cable.

The second jigging machine was placed aboard the Melville last autumn, and tested in the Antarctic during December and January. Dr. David Ainley, Point Reyes Bird Observatory, who was aboard to conduct sea bird censuses, ran the machine for Center scientists. After 11 hours of operation, no squids were seen or captured. It is known, however, that squids are abundant in the Antarctic since they are commonly found in the stomach contents of birds and mammals there.

Results to date suggest that a much more intense light source is necessary for successful aggregation of squids under the jigging machines, when the machines are used on large research vessels. Dr. Reilly's group is looking into acquiring such a light source, perhaps 10x the intensity of the current lighting arrangement for the two SWFC machines. As opportunities arise they plan to continue testing sampling gear to index the abundance of pelagic squids.

MULTISPECIES DATA MANAGEMENT AND FISHERY MONITORING

Dolphin Life History Data Base Reviewed and Updated

As part of the continuing efforts to ensure data quality, biological technicians Al Jackson and Tom Tumosa examined the marine mammal life history data bases during March. A software package was developed by computer programmer Lilly Tang to compare life history records with corresponding records contained in the marine mammal sighting and set log data bases. This was done for all data collected during the years 1966-1982. The data elements date, geographic location and set number were examined. This cross-referencing process identified 3836 cases for which the value of an element on a life history record did not match the value assigned to that same element on the corresponding records of the sightings and set log data bases. Upon examination of the original tuna/dolphin observer field notes and other relevant materials, the correct values for these data were determined and entered into the data bases.

The marine mammal data management system was modified by computer programmer Ken Wallace to accommodate the expanded 1983 life history data collection format. The marine mammal life history data collected during 1983 was then key-entered onto the VAX computer system, edited and added to the data bases. These life history data bases include information about length, weight, sex and geographic location of capture, as well as data about gonad development and evidence of ovulation for various marine mammal species. These data are analyzed by SWFC scientists to determine birth rates, age at sexual maturity, life span, gestation period and other vital parameters of

dolphins and whales. The majority of the life history data has been collected by the NMFS Southwest Region tuna/dolphin observers.

During 1983, data from more than 700 marine mammals were collected. The table below summarizes the numbers of individual specimens for which the SWFC now has life history data.

Marine mammal species	# specimens examined during 1983	# specimens examined for years 1966-1983
<i>Stenella attenuata</i>	341	17741
<i>Stenella longirostris</i>	281	8070
<i>Delphinus delphis</i>	58	2327
<i>Stenella coeruleoalba</i>	2	263
Other species	26	314
TOTALS	708	28715

Results of Atlantic Tuna Fishery Sampling Program Reported

Foreign-caught Atlantic tunas transshipped to Puerto Rico are sampled routinely for biological information by biological technician Eugene Holzapfel. Data on fork length, weight, and species composition of catches are collected. Of the 139 samples taken from catches made during 1983, 118 are from the eastern Atlantic (off the coast of Africa) and 21 are from the western Atlantic. Results of Mr. Holzapfel's sampling of catches during 1983 are as follows:

Species and gear	# of samples	# of fish sampled	Tonnage sampled (MT)
Yellowfin			
Purse seine	25	1677	647.0
Baitboat	28	2245	439.8
Longline	1	71	1.1
Unknown	15	1170	191.8
Skipjack			
Purse seine	12	607	3955.6
Baitboat	18	912	1791.6
Unknown	3	151	151.7

Bigeye			
Purse seine	19	611	305.5
Baitboat	2	69	1.0
Unknown	7	193	52.6
Albacore			
Longline	5	250	1463.5
Unknown	3	150	938.2
Blackfin			
Baitboat	2	100	13.3
Bullet tuna			
Purse seine	1	50	180.3

Mr. Holzapfel also obtained two length frequency samples of yellowfin tuna from transshipments of catches by French seiners fishing in the Indian Ocean.

Length frequency distributions from sampling yellowfin and skipjack tuna in Puerto Rico are presented in Figure 1. Several differences are apparent between fish transshipped from different areas of the Atlantic, and those caught by different gears. The distribution of sizes of yellowfin in purse seine catches from the eastern Atlantic is unimodal, and the fish are smaller than yellowfin in any other area-gear category (the larger from purse-seine catches in the eastern Atlantic are often separated and transshipped to markets in Europe). Yellowfin from eastern Atlantic baitboat catches show several size classes, as do those from Caribbean purse seine catches. Baitboat-caught yellowfin from the southwestern Atlantic are larger on the average than those from anywhere else, and are not clearly differentiated into distinct classes.

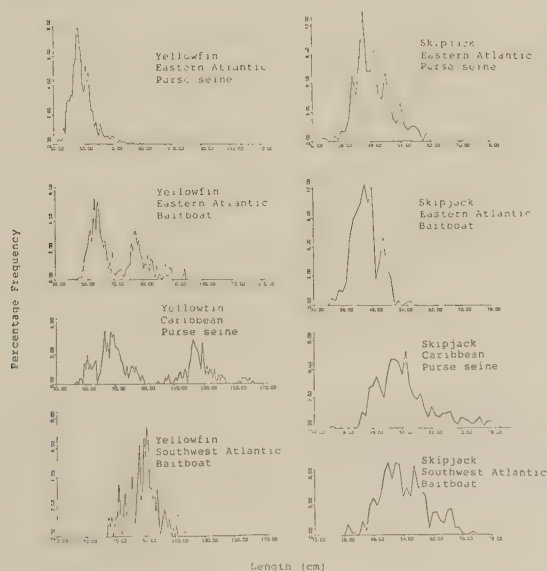


Figure 1. Length frequency distributions of foreign-caught Atlantic yellowfin and skipjack tunas from transshipments of catches to Puerto Rico made in 1983.

The length frequency distributions of skipjack tuna are dominated by one size class. Catches from the southwest Atlantic and Caribbean contain much larger fish on the average than those from the eastern Atlantic, with many more fish over 60 cm. These larger fish probably represent another size class.

IATTC Data Added to NMFS Sightings Data Base

Programmer analyst Ken Wallace and computer programmer Lily Tang, working in collaboration with Milton Lopez of the IATTC, have completed the transfer of IATTC marine mammal sightings data obtained from 1979 to 1983 to the NMFS data system. The transfer was negotiated by fishery biologists Wes Parks, SWFC, and Phil Hammond, IATTC.

The data were collected on cruises with IATTC observers and have been converted to a format compatible with an extracted data set of NMFS sightings. The information will be used initially by Dr. Parks in an analysis of sizes of schools of dolphin associated with the purse seine fishery for tropical tunas in the eastern Pacific Ocean. Results of the analysis will be used to assess the status of these dolphin, which in turn will form part of the basis for setting rules regulating the taking of dolphins by the fishery in 1986 and successive years.

PACIFIC ENVIRONMENTAL GROUP

Empirical Confidence Intervals Developed for Estimates of Environmental Variation

Development of indices of environmental variability related to fish stock variations is a continuing activity at PEG. In order to establish a basis for realistic estimates of precision of these indicator series, PEG Chief Andrew Bakun has been involved in an extensive program of subsampling of available maritime data using a computer-based random sampling system. By comparing numerous subsamples of various sizes and compiling the observed differences, Mr. Bakun is tracing the dependence of the precision of monthly estimates of various properties on density of available data. The study focuses on an area off the coast of Portugal, which is particularly rich in maritime data and appears to be typical of eastern ocean boundary upwelling regions such as the California and Peru Current regions.

Results for three observed properties, sea surface temperature, barometric pressure, and cloud cover, have recently been obtained. The differences between a given monthly value and the value for the same calendar month one year earlier provided measures of interyear variability. Summaries by 5- and 10-degree latitude/longitude quadrangle were considered. Conclusions include the following:

Of the three properties, cloud cover is the least precise to define. Even with samples of 200 observations per month only slightly more than half the indicated interyear differences appear to be significant at 0.9.

Barometric pressure is defined the most precisely. With 50 observations per sample more than three-fourths of the indicated interyear differences appear to be significant at 0.9.

There is a scale-dependence to the precision of monthly sea surface temperature variation such that 5° areal summaries yield substantially greater significance than 10° summaries for equal numbers of observations. However, if observations are somewhat evenly distributed over the four 5° quadrants, summarizing by 10° area may yield the best indication of inter-year variation. For example, for 50 observations per 5° areal sample about 55% of the indicated interyear differences are significant at 0.9, while for 200 observations per 10° areal sample nearly 70% appear to be significant. Interyear sea surface temperature variability within 5° of the coast is less precisely defined (for equal numbers of maritime reports) than temperature variability for areas further sea-ward.

There appears to be little advantage to summarizing barometric pressure or cloud cover by areas smaller than 10° latitude/longitude, unless the report distributions are so extremely biased that large portions of the area contain virtually no observations in comparison to other portions.

For report densities greater than about 25 per monthly sample, computations of precision based on the within-sample variance and the Central Limit Theorem, (i.e., proportional to sample standard deviation, inversely proportional to the square root of the sample size) appear to yield acceptable estimates of precision for all three properties.

TIBURON LABORATORY

UNDERUTILIZED FISHERIES RESOURCES

Cruise Preparations Underway

Preparations are being made by fishery biologists Sus Kato, Bill Leet, and Sennen Salapare for their upcoming cruise aboard the NOAA Ship David Starr Jordan in early May. Chief objectives of the cruise are to: 1) conduct experimental trapping for spot prawn, octopus, tanner crab and deep-water snails; 2) monitor fish aggregating devices (FADs) located at 60-Mile Bank, and check any fish associated with the FAD; 3) conduct experimental bottom longline fishing for ocean whitefish.

A number of fishermen from Crescent City to Santa Barbara have indicated their interest in trying to catch spot prawn and octopus. Interest has been especially high these past two years because El Niño has disrupted many traditional fisheries. During this cruise they will test special octopus pots which, if effective, would be easier to make and use than traditional clay pots or wooden traps.

Longlining for ocean whitefish has not been attempted in California, though the method is commonly used for other tilefishes on the east coast. The California ocean whitefish, like those in the east, is a potential high-priced product for the sashimi market and a moderately-priced frozen product. If catch rates are significant, a small fishery for this species is likely.

Trial Marketing of Shortbelly Rockfish Continues

During the last three years many attempts have been made to market shortbelly rockfish, perhaps the most abundant untapped rockfish resource on the West Coast. Thus far, none of these attempts has been successful, but interest in this fish remains high because of its availability. Recently shortbelly rockfish samples were provided to Dr. Sunee Sonu of the NMFS Southwest Region, who is participating in seafood shows in Hong Kong and Singapore. The fish were headed, tailed and gutted, and quick-frozen individually by Producer's Seafood, located in Oakland. The firm also provided samples to a local broker who, with help from the staff of this task, is attempting to persuade a large supermarket chain to commit shelf space for shortbelly rockfish for an extended period.

Herring Conference Held

A conference on the San Francisco and Bodega Bay herring fisheries was held on March 3, jointly sponsored by Sea Grant, Pacific Coast Federation of Fishermen's Association, City of Sausalito, Oceanic Society and Golden Gate Fishermen's Association. Economist Ed Ueber chaired the conference which was

attended by 100 people. The conference consisted of two panel discussions and a herring tasting. The first panel evaluated herring populations and featured Dr. Donald Gunderson of the University of Washington as speaker; the second panel was composed of conservationists, processors, and commercial and recreational fishermen.

FISH COMMUNITIES INVESTIGATION

Management of Rockfish Data Transferred to State Department of Fish and Game

Since 1977, the staff of the Groundfish Analysis Task at the Tiburon Laboratory has processed all data collected in a sampling program of rockfish landings. The sampling program was conducted in cooperation with the California Department of Fish and Game (CDF&G) but the data processing responsibilities are now being assumed by the State. This month task leader Dr. William Lenarz began transfer of these responsibilities. The first program of the system to be transferred is for data entry and editing, and is written in FORTRAN for the DFG Rainbow microcomputer, which is in each port office. Samplers will use the program to enter and edit sample data shortly after it is collected. The Menlo Park office of the CDF&G is testing the program, which is expected to be placed in the other offices by April 1. An additional program, one that calculates species composition from sample data, should be ready for testing by April 1.

PHYSIOLOGICAL ECOLOGY INVESTIGATION

Striped Bass Research Reviewed

Dr. Jeannette Whipple, Task Leader, Maxwell Eldridge and Dr. R. Bruce MacFarlane attended a workshop on striped bass in Lodi, California, on March 29. The Department of Fish and Game sponsored the interagency workshop to review research on striped bass and examine the status of the population. Dr. Whipple and Mr. Eldridge summarized their recent results and made new recommendations.

FISHERIES INFORMATION SYSTEMS AND AUTOMATIC DATA PROCESSING

CALFIN and PACFIN Update

Fred Kellenberger, SWFC and Svein Fougner, Southwest Region briefed the Director of the SWR and his staff on the CALFIN and PACFIN projects. The Director was very pleased with the progress of the FIN project. The SWFC is beginning to expand the PACFIN Fishery Research Information System (FRIS) to include 1982 landing and vessel data from California, Oregon, and Washington. Presently the system contains 1974, 1975, 1976, and 1980 landings and vessel data from the three states. FRIS is used by researchers to track vessels along the Pacific coast.

Financial Reporting System Implemented

The Financial Reporting System (FRS) was implemented on the Molecular Super-microcomputer 32X with the production of the Center, Resource Review, and YTD summary reports from the month end data for February. The CYOP summary report will be incorporated in the March summaries. Robert Bistodeau, Computer Technician, under a student appointment, is drafting a user's manual for the on-line data entry procedures.

On March 13 and 14, Robert Nydam and Ben Remington, Executive Officer, visited the staffs of the Pacific Environmental Group (PEG) in Monterey and the Tiburon Laboratory to introduce the FRS on-line data entry procedures. At the PEG site, the actual on-line demonstration of the procedure could not be completed because of communication problems between PEG and the Molecular Super-microcomputer 32X in the La Jolla Laboratory. To resolve the communication problems, Bob Nydam and Mike Spruth are in contact with Micom, the vendor for the error controller boxes. These units are necessary for the long distance communication to and from the La Jolla Molecular Super-microcomputer 32X. Demonstration of the procedure at the Tiburon site was performed on the CRT terminal linked to their Molecular Super-microcomputer 32X.

Meeting on Word Processing System Held

The word processing committee met on March 8 to review the implementation of WordStar as the word processing system for the La Jolla Laboratory. Frances Tonsich, Nancy LaRoche (Director's Office), Frances Begley, Al Coan (OFRD), Julie Shoemaker, Reuben Lasker (CFRD), Lorraine Prescott (TSG), Susan Iacometti, Jack Brown, Mike Spruth, Fred Kellenberger, and Dorothy Roll attended the meeting. Nancy LaRoche and Julie Shoemaker reported that they have had a positive experience using WordStar. The users expressed a need for a consultant/teacher with WordStar expertise, who could teach an advanced course and would be available by phone for highly technical assistance and advice.

Dr. Paul Black, a professor at Long Beach State University, has agreed to conduct on-site training classes for the secretarial and scientific staff on WordStar. The Introductory and Advanced courses will consist of four, 3-hour sessions, and at least two series of the advanced will be taught. The first session for both courses will be held on April 5, for the secretarial staff.

Other ADP Activities

The Data Management and ADP Operations staff met on March 8 to discuss the hardware implementation of the Molecular Super-microcomputer 32X, the building of the La Jolla Standard word processing microunits for the Oceanic Fisheries Resources Division (OFRD) and the Technical Support Group (TSG), and the implementation of the MP/M (multi-user) mode for these and other microcomputer units. Fred Kellenberger, Data Systems Manager, Dorothy Roll, Chief, ADP Operations, Jack Brown, Electronics Engineer, Robert Nydam, Computer Programmer Analyst, Susan Iacometti, Computer Systems Programmer, and Mike Spruth, Electronics Technician attended the meeting. Because of the consistent downtime of the Molecular Super-microcomputer 32X owing to hardware and software failures, it was decided to contract with a Molecular expert to help test the unit and to retain the specialist on a as needed basis after the initial testing. Currently, the Molecular Super-microcomputer 32X is functional in a multi-user mode for the Financial Reporting System.

* * * * *

Susan Iacometti returned from LEG III of the Jordan's CalCOFI cruise and reported the Molecular Super-microcomputer 15-8 System continues to function well under sea-going conditions. She is developing an operations manual for the shipboard unit. During this cruise, she began coding and testing some of the programs for the ship's food inventory control and reporting system.

MISCELLANEOUS

Southwest Fisheries Center Celebrates Ocean Science Day at Honolulu and La Jolla Laboratories

The Honolulu Laboratory observed Ocean Science Day on March 9, 1984, with an open house for specially invited public high school students in Hawaii at the Kewalo Research Facility. Ocean Science Day was the kickoff for the Year of the Ocean, which is to be a year-long observance of the importance of the ocean in human life. The open house included a tour of the facilities and exhibits of live tunas in tanks, fishing and scientific equipment and gear, biological specimens, and presentations describing the Honolulu Laboratory's research work. Laboratory Director Richard Shomura gave a welcoming speech to the students.



Richard Shomura, Honolulu Laboratory Director, welcomes the Hawaii public high school students to the Ocean Science Day open house at the Kewalo Research Facility.



Fishery Biologist Randolph K. C. Chang explains the feeding response of tunas to students at the open house.



Fishery biologist Thomas K. Kazama speaking to students on the results of his experiments on the rearing and feeding of larval mahi mahi, Coryphaena hippurus, and tunas.



Research Assistant Victor A. Honda (left) and Fishery Biologist Thomas S. Hida (center) demonstrate the application of electronic equipment in fishery research to teachers and students.

On March 9, 1984, NOAA facilities in 12 cities throughout the U.S. celebrated Ocean Science Day. At the Southwest Fisheries Center, 147 students and teachers from 27 San Diego area high schools attended seminars and viewed displays on various subjects related to the ocean.

Dr. Izadore Barrett began the day with a welcoming speech to the participants who then proceeded to one of four seminars which were repeated throughout the day. During one seminar, Mr. Wilbur Shigehara from the National Weather Service discussed the role the oceans play in determining the weather. Dr. Gerry Kuhn, Scripps Institution of Oceanography, and Dr. Bill Masditch, San Diego State University, discussed the effect of waves and weather on the southern California shoreline.

Dr. Michael Laurs and Ms. Sandra Hawes presented a seminar on the effect of the physical and chemical environment of the ocean on the abundance and distribution of fish and on fishery interactions. Drs. Alec MacCall, Pierre Kleiber and Tim Smith presented a hands-on simulation of the management of a commercial fishery. During a fourth seminar, Drs. Geoffrey Moser, Albert Myrick, and John Graves gave presentations on the functional morphology of fish and marine mammals. Participants viewed displays set up in the courtyard and outside the seminar rooms during the scheduled breaks.

The seminars reflected the diversity of the Center's work. Participants had a chance to see a frozen dolphin and tuna; they learned about research vessels and earth-orbiting satellites used to measure the distribution of

fish; and in playing a computer game they better understood the kinds of choices a commercial fisherman must make in order to stay in business.

Ocean Science Day was the kickoff for the Year of the Ocean--a nationwide observance of the importance of the ocean in all aspects of our lives. Throughout the year, ocean-related organizations will sponsor events and activities about the ocean.



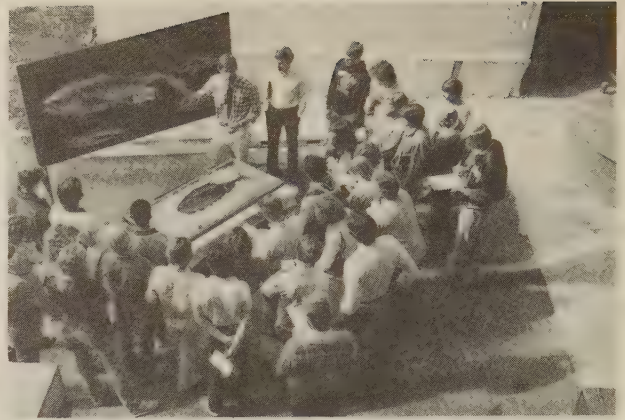
Dr. Izadore Barrett welcomes students and teachers.



Participants visit displays and enjoy refreshments.



Dr. Albert Myrick describes the adaptations of dolphins.



Dr. John Graves explains the functional morphology of tunas.



Ms. Sandra Hawes discusses fishery interactions



Dr. Michael Laurs talks about the abundance and distribution of fish.



Dr. Geoffrey Moser shows illustrations of morphological adaptations of fish larvae.



Drs. Alec MacCall (left), Tim Smith (center) and Pierre Kleiber (right) explain the rules for a computer simulation of a commercial fishery.

PUBLIC AFFAIRS

Honolulu Laboratory

On March 1, 1984, Richard S. Shomura, Laboratory Director, presented a talk to Dr. James Parrish's zoology class at the University of Hawaii.

On March 2 and 13, Dr. Brill lectured to graduate division classes at the University of Hawaii. The first lecture was on fish thermoregulation and was presented to a class in the Department of Physiology. The second lecture was given to a class in the Department of Oceanography and was on tuna and their place in the pelagic ecosystem.

La Jolla Laboratory

On March 5, 1984, Dr. Al Myrick spoke to 100 pupils at the Mar Vista High School on "Behavioral adaptations in pelagic dolphins." On March 12, 1984, Dr. Myrick spoke to 100 pupils at the Farb Middle School on "Cetaceans and cetacean research." His lecture was a part of the San Diego County School's lecture program, "Meet the Scientist."

Tiburon Laboratory

Tina Echeverria and Nancy Wiley of the Tiburon Laboratory participated in the 4th San Mateo County Student Conference held at Skyline College, San Bruno, on March 17. The Conference, which was entitled "Expanding Your Horizons in Science and Mathematics," was held to increase young women's interest in science and mathematics, to foster awareness of career opportunities for women in math- and science-related fields, and to provide students an opportunity to meet and form personal contacts with women working in traditional and nontraditional occupations.

* * * * *

Nine staff members from the Tiburon Laboratory took part in the International Sportsmen's Exposition held in San Francisco from May 21-25. The personnel attended a booth set up by the Southwest Region and answered questions asked by the public. As usual, the most popular items on display were the seafood recipes and sharks.

PRESS RELEASE

Honolulu Laboratory

March 5 - "Fishery Laboratory to Observe Ocean Science Day."

SEMINARS

La Jolla Laboratory

- March 12 - Dr. John Bengtson, University of Minnesota, presented "Seals and penguins as indicator species in Antarctic Marine ecosystems."
- 20 - Dr. Charles Pyke, Hydrology, U.S. Corps of Engineers, Los Angeles, California, presented "Relationships of the 1982-83 El Nino to unusual weather and surf conditions in the southwestern United States."
- 27 - Dr. Phillip Hammond, Inter-American Tropical Tuna Commission, presented "Learning about dolphin populations through aerial photography."

VISITORS

Honolulu Laboratory

- March 1 - Dr. Craig MacDonald of the Ocean Resources Office, Hawaii Department of Planning and Economic Development (DPED), met with Richard Shomura to discuss the Department of Interior-DPED environmental impact statement on mining manganese crusts on seamounts within the 200-mile U.S. Fishery Conservation Zone around Hawaii.
- Charles Tenakanai, Fisheries Research Officer, Department of Primary Industry, Papua New Guinea, Baraniko Raobati, Fisheries Officer (Aquaculture), Kiritimati, Kiribati, and Dr. Roger Uwate of the Pacific Islands Development Program, East-West Center, visited Richard Shomura.
- 2 - Pamela Bontrop, University of Hawaii, graduate student, visited Dr. Boehlert to discuss research related to OTEC at the Kewalo Research Facility.

- 6 - Robert Stone of Fiji visited Richard Shomura.
- 12 - Dr. Robert L. Burgner, Director, Fisheries Research Institute, University of Washington, Seattle, Washington, met with Acting Laboratory Director William G. Gilmartin and John R. Henderson to discuss the workshop on "Fate and impact of marine debris," scheduled from 26 to 29 November 1984 in Honolulu.
- 19 - Dr. James Brock and Dr. H. Van Campen visited to examine the Laboratory's collection of penaeid shrimps collected in the early 1970s.
- 20 - Kohei Kihara, visiting scholar at the University of Washington, Seattle, Washington, and teaching associate at the Tokyo University of Fisheries, visited Reginald Gooding and James H. Uchiyama to discuss tuna and insular and seamount resources.
- 22 - David Shideler, Cultural Surveys Hawaii, visited William Gilmartin and James Uchiyama.
- 27 - Dr. Jack Davidson, University of Hawaii Sea Grant College Program, met with Richard Shomura and Dr. Polovina to discuss the snapper-grouper workshop.

Pacific Environmental Group

- March 8 - Kenneth Parker, International North Pacific-Halibut Commission, Seattle, Washington, visited the Center.
- 13 - Ben Remington and Bob Nydam, SWFC, demonstrated terminal access to the FRS system.
- 15 - Otto Steffin, National Ocean Service, NOAA, Rockville, Maryland, visited the Center.
- 29 - Fernando Arcos, INP Ecuador and Jorge Laguna, Panama; Tinker Foundation Fellows, both from Scripps Institution of Oceanography, La Jolla, California, visited the Center.

Tiburon Laboratory

- March 2 - Victor Yeh Ho, the World Corporation, Crows Landing, California, visited the Center.
- 6 - Boyce Steiner, General Services Administration, San Francisco, California, visited the Center.

- Sarah Webb, Cardillo Travel, San Francisco, California, visited the Center.
- 9 - David Fraser, Cape Flattery Fisheries, Seattle, Washington, visited the Center.
- Lori Hamilton, Cape Flattery Fisheries, Seattle, Washington, visited the Center.
- 10 - John Maciolek, U.S. Fish and Wildlife Service, Seattle, Washington, visited the Center.
- 12 - John Malmati, Fort Bragg, California, visited the Center.
- 20 - Al Millikan, Washington Department of Fisheries, Seattle, Washington, visited the Center.
- Jack Robinson, Oregon Department of Fish and Wildlife, Newport, Oregon, visited the Center.
- Kate King, NMFS, Northwest Region, Seattle, Washington, visited the Center.
- Henry Wendler, Pacific Fishery Management Council, Portland, Oregon, visited the Center.
- Robert Francis, NMFS, Northwest and Alaska Fisheries Center, Seattle, Washington, visited the Center.

MEETINGS AND TRAVEL

Honolulu Laboratory

- March 11-24 - Richard Shomura traveled to Japan for the Indo-Pacific Tuna Program (IPTP) Expert Consultation meeting called by Dr. Paul Hooker, Director, IPTP, Sri Lanka; he met with Japan Fishery Agency officials regarding the workshop on "Fate and impact of marine debris," and with Dr. John Gissberg, Fisheries Attache, in Tokyo; he also attended the seamount workshop in Shimizu, Japan.
- 16 - Dr. Skillman attended the meeting of the Hawaii Fisheries Coordinating Council at the Hawaii Department of Land and Natural Resources board room.
- 21-23 - Richard Uchida, Dr. Boehlert, Dr. Jerry A. Wetherall, Robert L. Humphreys, Jr., Michael P. Seki, and Darryl T. Tagami attended the seamount workshop in Shimizu, Japan.

La Jolla Laboratory

- March 12-14 - Ben Remington and Robert Nydam traveled to Monterey and Tiburon to introduce and discuss FRS system to users.
- 12-14 - Dr. Dan Huppert traveled to Seattle, Washington, to attend PFMC and SSC meetings.
- 12-16 - Dr. Gary Sakagawa visited Horta, Portugal, to attend the 4th Week of Fisheries and to present the results of ICCAT's International Skipjack Year Program.
- 12-16 - Dr. Izadore Barrett traveled to Horta, Portugal, to attend the 4th Week of Fisheries where he presented an invited talk on fisheries management in the U.S. Fishery Conservation Zone.
- 14-16 - Data Systems Manager Fred Kellenberger attended a Computing Software Conference in Los Angeles.
- 19 - Dr. Gary Sakagawa and Al Coan traveled to Terminal Island to gather data for the western Pacific tuna purse seine fishery.
- 19-23 - Dr. Izadore Barrett went to Shimizu, Japan to attend an informal workshop on the Environment and Resources of Seamounts in the North Pacific.
- 22 - Fred Kellenberger traveled to Terminal Island to brief the SWR on FIN and ADP activities.
- 22-4/2 - Jay Barlow was in Seattle, Washington, to confer with personnel and to give a seminar at the National Marine Mammal Laboratory.
- 26-30 - Dave Mackett, Planning Officer, traveled to Washington, D.C. to attend a Center Planners Conference.
- 28-31 - Mark Lowry traveled to La Paz, Mexico, to attend an Annual Marine Mammal Meeting.

Tiburon Laboratory

- March 6-9 - Dr. William Lenarz traveled to Santa Barbara to participate in a workshop on interaction between seismic exploration and fisheries.
- 14 - Dr. William Lenarz met with Frank Henry, Department of Fish and Game, in Menlo Park to begin transfer of data processing of rockfish samples.
- 15 - Drs. Alec MacCall, Dan Huppert, and Rick Methot of the SWFC met with Dr. William Lenarz and Mickey Eldridge at the Tiburon Laboratory to prepare guidelines for the Center Groundfish Research Planning Program.
- 20-22 - The Groundfish Management Team met at the Tiburon Laboratory.
- 29 - Dr. Jeannette Whipple, Mickey Eldridge, and Dr. R. Bruce MacFarlane attended an interagency workshop on striped bass. The workshop was held in Lodi and sponsored by The California Department of Fish and Game.
- 29 - Sus Kato traveled to Santa Barbara and Morro Bay,
4/1 California, to discuss aspects of R/V David Starr Jordan Cruise No. DS 84-04 (175) with fishermen and officials knowledgeable about activities of seismic oil exploratory boats. He also checked on availability of vessels and processors for experimental fishing for pelagic red crabs off south-central California.

Pacific Environmental Group

- March 4-8 - Five PEG staff members gave invited presentations at the Workshop on Climate Variability of the Eastern North Pacific and Western North America. The presentations included "Coastal upwelling indices" by Andy Bakun; "Ocean station data bases and seasonal and interannual variability" by Dave Husby; "Ships-of-opportunity data base and some climate-related results" by Doug McLain; "Temporal variability of northern Pacific fisheries" by Dick Parrish; "Frequency domain analysis of climate and fisheries co-variability" by Roy Mendelssohn. In addition, Parrish chaired the session on "Biology, Chemistry and Fisheries" and Bakun chaired the session on "Data Analysis Methodology." Parrish will serve on the editorial board of a monograph volume to be sponsored by the American Geophysical Union. McLain will serve on a committee for data base identification and evaluation. The workshop was held at the Asilomar Conference Center

in Pacific Grove, March 4-8, and was co-sponsored by the NOAA National Climate Program Office and the U.S. Geological Survey.

TRAINING

Tiburon Laboratory

- March 5-9 - William S. Leet, Fishery Biologist - Introduction to Supervision.
- 20-23 - Candis Cooperrider, Computer Programmer - Introduction to Computer File Structure and Data Base Design.

PERSONNEL

Honolulu Laboratory

- March 2 - Irene H. Toyomura, Editorial Assistant - Voluntary Retirement.
- 4 - Louise F. Lembeck, Editorial Clerk - Conversion to Reinstatement-Career.
- 12 - Doris J. Alcorn, Biological Technician (Wildlife) - Full-Time, Temporary Appointment.
- Robert G. Forsyth, Biological Technician (Wildlife) - Full-Time, Temporary Appointment.
- 13 - Robin L. Westlake, Biological Technician (Wildlife) - Intermittent Temporary Appointment.
- 16 - Corazon A. Myers, Computer Clerk - Termination - Expiration of Appointment.
- 18 - Virginia L. Ishida, Editorial Clerk - Promotion.
- 20 - Lynn M. Hondonero, Clerk-Typist - Conversion to Excepted Appointment.
- 20 - Fred R. Frizelle, III, Computer Clerk - Conversion to Temporary Part-Time Appointment.

La Jolla Laboratory

- 7 - Eugene Sibbald, Computer Systems Programmer - Extension of Temporary Appointment.
- G. Jay Walker, Computer Systems Programmer - Extension of Temporary Appointment.
- 16 - Anita Holmsen, Biological Aid - Resignation.
- 22 - Thomas Polacheck, Fishery Biologist - Resignation.
- 29 - Peggy Cheng, Computer Assistant - Resignation.
- 31 - Lily Tang, Computer Assistant - Recruitment.

Pacific Environmental Group

Russell Brainard, LTJG NOAA Corps, reported March 7 for a 3-year tour of duty at PEG.

Jerold Norton was selected for PEG's vacant oceanographer position; he will report on April 16.

Update on A-76 Study at SWFC

On March 26, 1984, the Center received Arthur Young and Company's Draft Management Efficiency Study (MES) for the OMB Circular A-76 review currently in progress for the Center's ADP operations. The draft report has been critically reviewed by a Center team including representatives from the Coastal and Oceanic Fisheries Resources Divisions in La Jolla, the Data Systems Manager, and the Executive Officer. On March 30, a meeting was held with representatives of Arthur Young and the review team to discuss the draft report and to seek additional information concerning the proposed recommendations.

As a result of this meeting, the Center has agreed to furnish additional information and to provide comments on the Draft MES upon receipt of the Arthur Young response to the written questions provided by the review team. Upon receipt of the final MES, the Center will forward it, with comments, through NMFS to the Associate Administrator for further action. If accepted by NOAA, the second part of the study (Phase II), the Performance Work Statement, will begin which will be followed by (Phase III) the Cost Estimate. The current approved schedule to complete all phases of the study was projected to be September 30, 1985, but delays thus far may require readjustments to the schedule.

HONORS AND AWARDS

Dr. Roger Hewitt Promoted to Rank of Commander

Dr. Roger Hewitt, a member of NOAA's Commissioned Corps, was promoted to the rank of Commander on March 14, 1984. He was also given a new assignment as Commanding Officer of the NOAA Ship Miller Freeman. The ship is a 2,000 ton, 215 foot fisheries research trawler with a complement of 52 including officers, crew and scientists. The assignment is for 2 years and will begin October 1984.



Dr. Hewitt came to the Southwest Fisheries Center in 1973. During his three tours of duty at the Center, he worked as a biological oceanographer on fish and marine mammal populations and authored 14 fishery-related publications. He took a year of academic leave in 1975 to study at Scripps Institution of Oceanography where he received a Master's Degree in Oceanography and Ph.D. in Marine Biology in 1982. Between assignments to the SWFC, Commander Hewitt served as a ship's officer aboard the NOAA Ships Townsend Cromwell and David Starr Jordan and as executive officer on the Miller Freeman.

Before coming to La Jolla, Commander Hewitt served as operations officer aboard the NOAA Ship Davidson and as chief of a photogrammetric survey party. During these assignments he mapped coastal features on all of the marine coasts of the United States as well as the Mississippi River. He obtained a Bachelor's Degree in civil engineering from the University of Santa Clara before being commissioned in 1969. Dr. Hewitt also holds professional engineer's and land surveyor's licenses for the State of California.

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